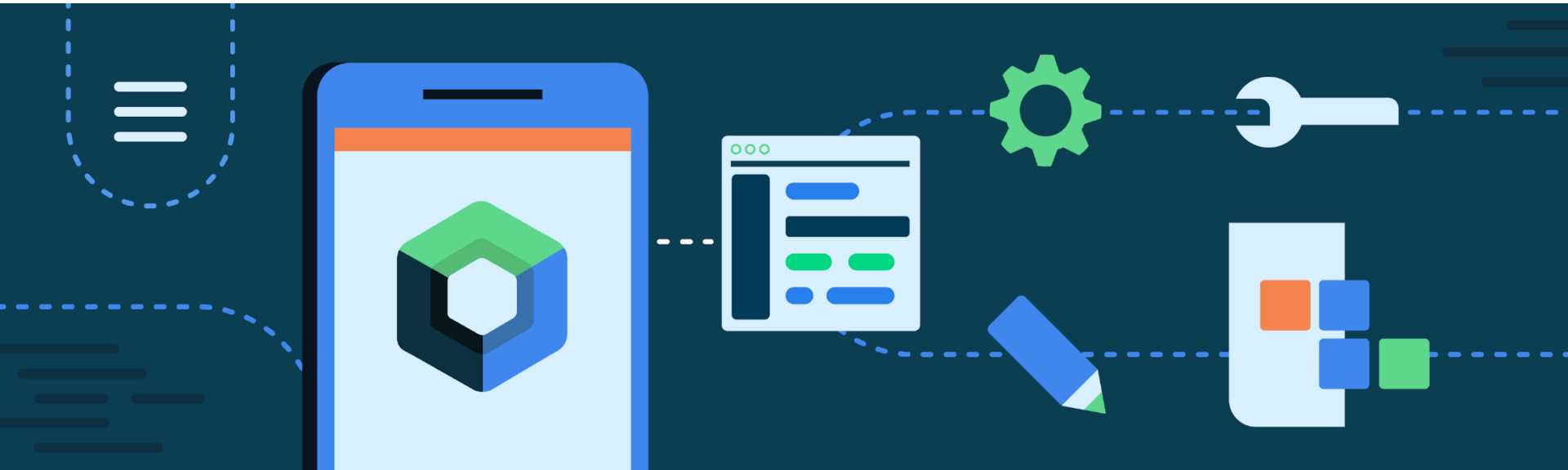


CMPS 312



UI Components and Layouts

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Outline

1. UI Components
2. Layouts

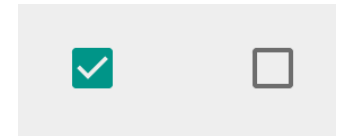
Examples are available @
[cmeps312-content/examples/05.ui-components-layouts](#)

UI Components

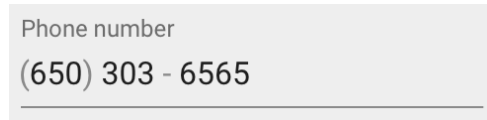
Button



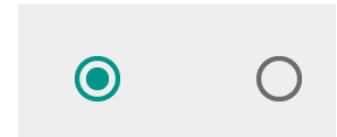
CheckBox



TextField



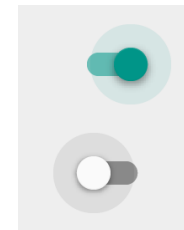
RadioButton



Slider

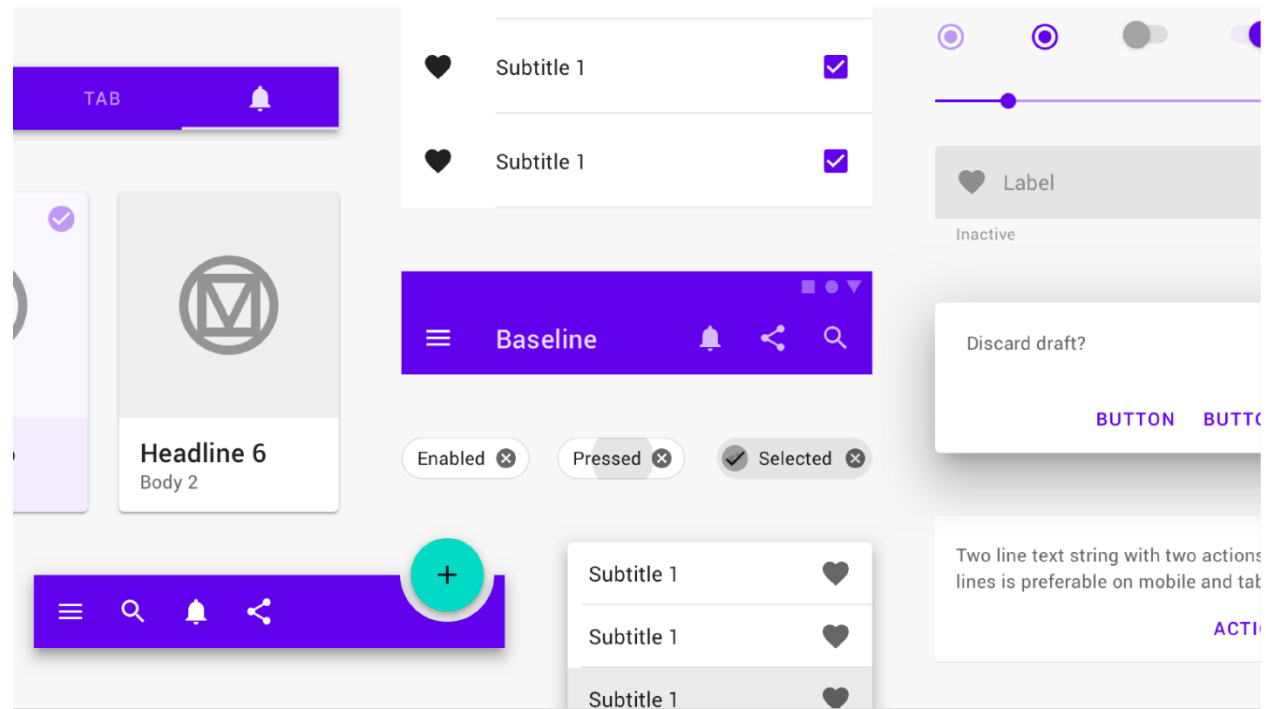


Switch



UI Components

- Built-in Jetpack Compose UI Components follow Google Material design system
<https://material.io/>
 - Provides a **consistent experience** across all platforms and applications (Android, Web, Flutter, iOS)



Text box

- **Text()** displays a simple text

```
Text(  
    text = "Jetpack Compose",  
    style = MaterialTheme.typography.h4  
)
```

Jetpack Compose

```
Text(  
    text = "سور القرآن الكريم",  
    textAlign = TextAlign.Center,  
    modifier = Modifier.fillMaxWidth(),  
    style = TextStyle(  
        fontWeight = FontWeight.Bold,  
        fontSize = 24.sp,  
        color = Color.Blue,  
        textDirection = TextDirection.Rtl  
    )  
)
```

سور القرآن الكريم

TextField

- **TextField()** collects input from a user. For more styling options, use **OutlinedTextField()**

@Composable

```
fun NameEditor(name: String, onNameChange: (String) -> Unit) {  
    OutlinedTextField(  
        value = name,  
        onValueChange = onNameChange,  
        label = { Text("Your name") }  
    )  
}
```



Keyboard options

- TextField lets you set keyboard configurations options, such as the keyboard layout, or enable the autocorrect, capitalization, autoComplete, keyboardType
- Also, it lets you to set a visual formatting of the input value, like replacing characters with * for passwords

@Composable

```
fun PasswordTextField() {  
    var password by remember { mutableStateOf("") }  
}
```

```
OutlinedTextField(  
    value = password,  
    onChange = { password = it },  
    label = { Text("Password") },  
    visualTransformation = PasswordVisualTransformation(),  
    keyboardOptions = KeyboardOptions(keyboardType = KeyboardType.Password)  
)  
}
```



▼ cmpps312.compose
▼ components
 TextFieldScreen.kt

Image

- Displays an image from the res/drawable folder

```
Image(painter =  
    painterResource(R.drawable.img_compose_logo),  
    contentDescription = "Jetpack compose logo",  
    modifier = Modifier.height(300.dp))
```



Button

```
Button(onClick = {}) {  
    Text("Button")  
}
```

```
OutlinedButton(onClick = {}) {  
    Text("OutlinedButton")  
}
```

```
TextButton(onClick = {}) {  
    Text("TextButton")  
}
```

// Search icons @ <https://fonts.google.com/icons>

```
IconButton(onClick = {}) {  
    Icon(  
        Icons.Outlined.Search,  
        contentDescription = "Search",  
    )  
}
```

```
IconButton(onClick = {}) {  
    Icon(painterResource(id = R.drawable.ic_quran), "Quran")  
}
```

Button

OutlinedButton

TextButton



▼ cmps312.compose
▼ components
 ButtonScreen.kt

Radio Button

- A Radio Button is used to select a **single** option from a list of options

```
radioOptions.forEach { option ->
    Row(
        Modifier
            .fillMaxWidth()
            .selectable(
                selected = (option == selectedOption),
                onClick = { onOptionSelected(option) }
            )
            .padding(horizontal = 16.dp, vertical = 4.dp)
    ) {
        RadioButton(
            selected = (option == selectedOption),
            onClick = { onOptionSelected(option) }
        )

        Text(
            text = option,
            modifier = Modifier.padding(start = 8.dp)
        )
    }
}
```

Which is your most favorite language?

- ☐ Java
- ☒ Kotlin
- ☐ JavaScript



```
▼ cmps312.compose
  ▼ components
    RadioButtonScreen.kt
```

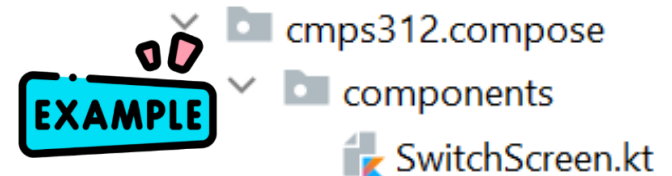
Switch

- A Switch toggle the state of a single item on or off

Turn on dark theme



```
Row {  
    Text(  
        text = "Turn on dark theme",  
        modifier = Modifier.padding(end = 8.dp)  
    )  
    Switch(  
        checked = isDarkMode,  
        onCheckedChange = { isDarkMode = it }  
    )  
}
```



Checkbox

- Checkbox is used to represent two states i.e., either checked or unchecked

DropDown

Slider

Snackbar

Layouts



<https://developer.android.com/jetpack/compose/layouts/basics>

Responsive UI



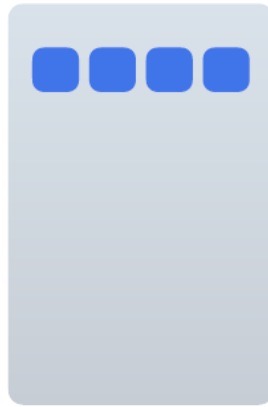
- Layout automatically **controls** the **size** and **placement** (**position** and **alignment**) of UI elements to create a **Responsive UI**
 - Layouts provide an efficient way to **distribute space** among items while accommodating different screen sizes
 - Frees programmer from handling/hardcoding the sizing and positioning of UI elements
 - **Responsive UI** = When the screen is resized, the views reorganize themselves based on the rules of the layout

Layouts

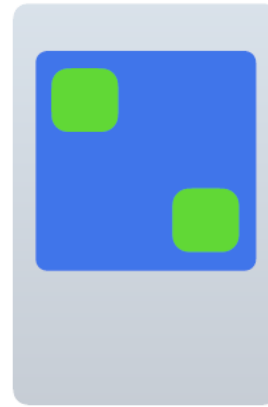
- Use a Layout to **position** UI elements on the screen
 - Control of space distribution and alignment of items in a container
- **Row** - position elements horizontally
- **Column** - position elements vertically
- **Box** - position elements in the corners of the screen or stack them on top of each other
- Use [Constraint Layout](#) (self-study) for complex layouts



Column



Row



Box



Constraint
Layout

Row & Column Example

- Group multiple basic layouts to create a more complex screen
- Use vertical or horizontal **Arrangement** to change the position of elements inside the Row or Column

```
@Composable
fun ArtistCard(artist: Artist) {
    Row(verticalAlignment = Alignment.CenterVertically) {
        Image(/*...*/)
        Column {
            Text(artist.name)
            Text(artist.lastSeenOnline)
        }
    }
}
```



Alfred Sisley

3 minutes ago

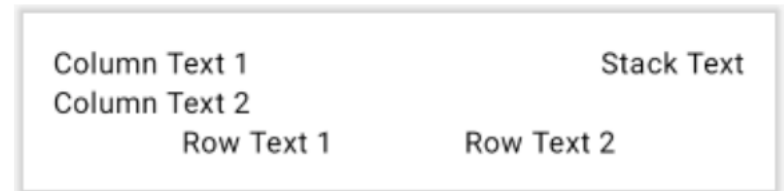
Box Example

```
@Composable
fun ArtistAvatar(artist: Artist) {
    Box {
        Image(/*...*/)
        Icon(/*...*/)
    }
}
```



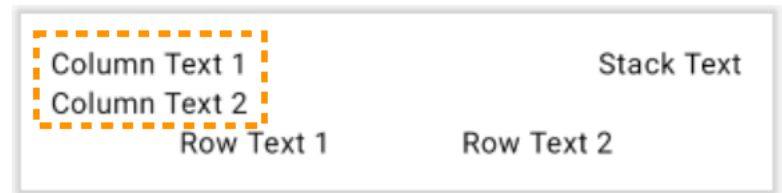
Box Example (1 of 4)

```
Box(modifier = Modifier.fillMaxWidth()) {  
    Column(  
        modifier = Modifier  
            .padding(16.dp)  
            .fillMaxWidth()  
    ) {  
        Text("Column Text 1")  
        Text("Column Text 2")  
  
        Row(  
            modifier = Modifier.fillMaxWidth(),  
            horizontalArrangement = Arrangement.SpaceEvenly  
        ) {  
            Text(text = "Row Text 1")  
            Text(text = "Row Text 2")  
        }  
    }  
    Text(  
        "Stack Text",  
        modifier = Modifier  
            .align(Alignment.TopEnd)  
            .padding(end = 16.dp, top = 16.dp)  
    )  
}
```



Box Example (2 of 4)

```
Box(modifier = Modifier.fillMaxWidth()) {  
    Column(  
        modifier = Modifier  
            .padding(16.dp)  
            .fillMaxWidth()  
    ) {  
        Text("Column Text 1")  
        Text("Column Text 2")  
  
        Row(  
            modifier = Modifier.fillMaxWidth(),  
            horizontalArrangement = Arrangement.SpaceEvenly  
        ) {  
            Text(text = "Row Text 1")  
            Text(text = "Row Text 2")  
        }  
    }  
    Text(  
        "Stack Text",  
        modifier = Modifier  
            .align(Alignment.TopEnd)  
            .padding(end = 16.dp, top = 16.dp)  
    )  
}
```



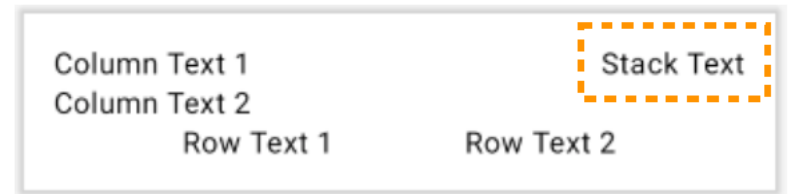
Box Example (3 of 4)

```
Box(modifier = Modifier.fillMaxWidth()) {  
    Column(  
        modifier = Modifier  
            .padding(16.dp)  
            .fillMaxWidth()  
    ) {  
        Text("Column Text 1")  
        Text("Column Text 2")  
  
        Row(  
            modifier = Modifier.fillMaxWidth(),  
            horizontalArrangement = Arrangement.SpaceEvenly  
        ) {  
            Text(text = "Row Text 1")  
            Text(text = "Row Text 2")  
        }  
    }  
    Text(  
        "Stack Text",  
        modifier = Modifier  
            .align(Alignment.TopEnd)  
            .padding(end = 16.dp, top = 16.dp)  
    )  
}
```



Box Example (4 of 4)

```
Box(modifier = Modifier.fillMaxWidth()) {  
    Column(  
        modifier = Modifier  
            .padding(16.dp)  
            .fillMaxWidth()  
    ) {  
        Text("Column Text 1")  
        Text("Column Text 2")  
  
        Row(  
            modifier = Modifier.fillMaxWidth(),  
            horizontalArrangement = Arrangement.SpaceEvenly  
        ) {  
            Text(text = "Row Text 1")  
            Text(text = "Row Text 2")  
        }  
    }  
    Text(  
        "Stack Text",  
        modifier = Modifier  
            .align(Alignment.TopEnd)  
            .padding(end = 16.dp, top = 16.dp)  
    )  
}
```



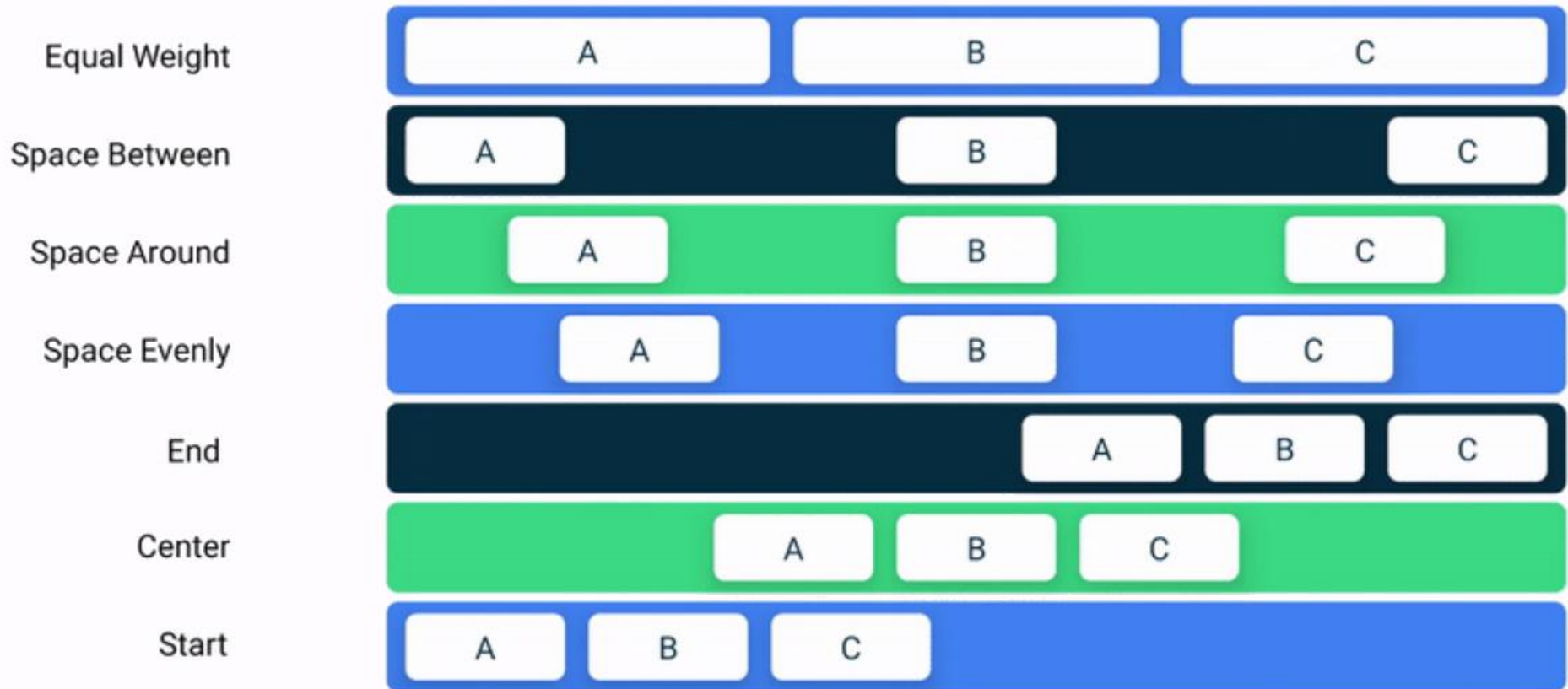
Surface & Card

- A **Surface** can hold only one child with an option to add a border and elevation
 - Add a layout inside Surface to position multiple elements
- A **Card** is a just a Surface with default parameters

Alignment

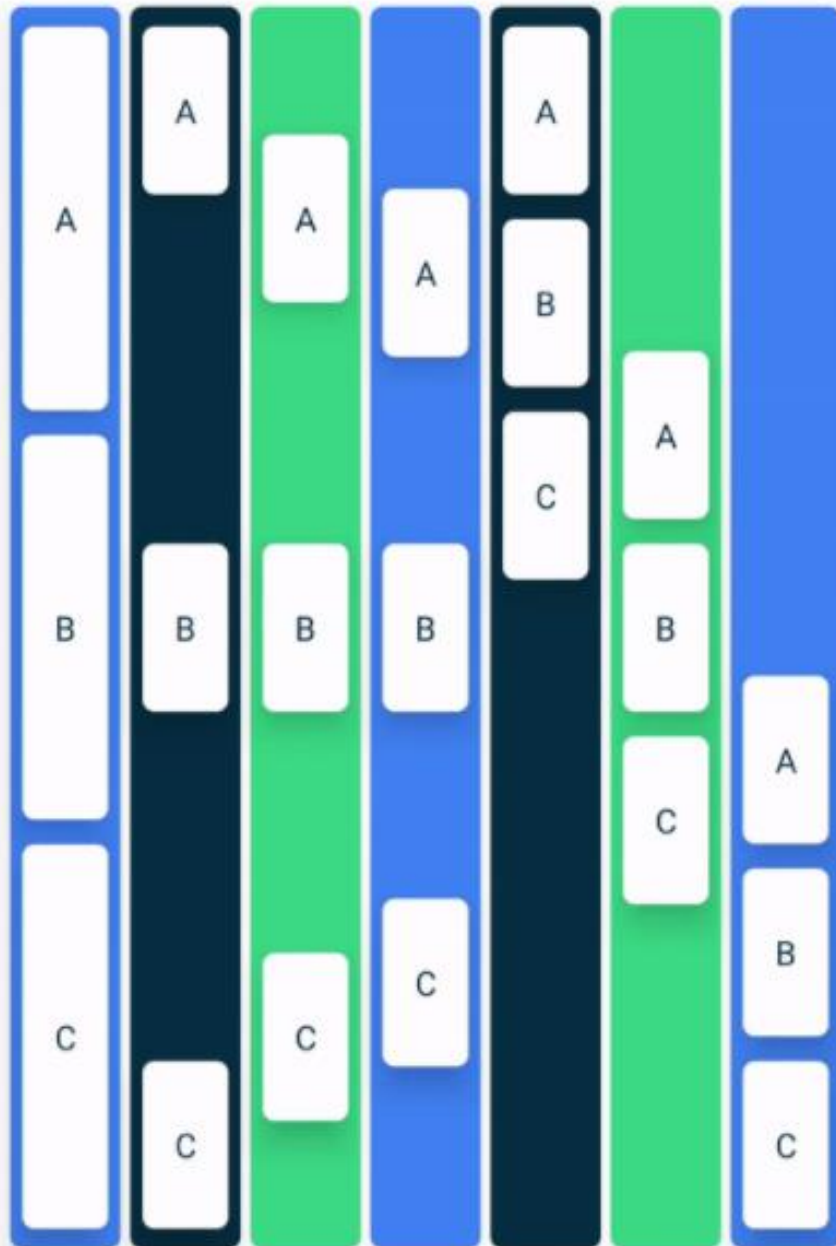
- To set children's position within a Row, set the **horizontalArrangement** and **verticalAlignment** arguments
- For a Column, set the **verticalArrangement** and **horizontalAlignment** arguments

Horizontal Arrangement



- Distribute extra leftover free space along the horizontal axis
- You also you can use **spacedBy**(space: Dp) to specify the space between child elements
- More details available at thin [link](#)

Equal Weight Space Between Space Around Space Evenly Top Center Bottom



Vertical Arrangement

- Distribute extra leftover free space along the vertical axis

Responsive Layout

- Use the **weight** modifier in Row and Column layouts to change the **proportion** of the screen child elements will use
 - Distribute space among items in a container while accommodating different screen sizes
- Modifier.*fillMaxWidth*() fill available width
- Modifier.*fillMaxHeight*() fill available height
- Modifier.*fillMaxSize*() fill available width and height
- For more control use [Constraint Layout](#) (self-study) for complex scenarios

Resources

- Jetpack compose tutorial

<https://developer.android.com/jetpack/compose/tutorial>

- Jetpack compose Code Labs

<https://developer.android.com/courses/pathways/compose>

- Jetpack Compose Playground - UI component examples

<https://foso.github.io/Jetpack-Compose-Playground/>

<https://github.com/Foso/Jetpack-Compose-Playground>

<https://github.com/Gurupreet/ComposeCookBook>

- Compose Samples

<https://github.com/android/compose-samples>